

CLAIMS

1. An electrically powered hammer comprising:
 - a hammering mechanism;
 - a rotatably driven intermediate shaft including a set of drive teeth;
 - a wobble drive arrangement for reciprocatingly driving the hammering mechanism, which wobble drive arrangement includes a wobble sleeve mounted on the intermediate shaft and the wobble sleeve includes a set of driven teeth; and
 - a mode change element selectively engageable, by movement along the intermediate shaft, such that when the mode change element is engaged with the drive teeth and the driven teeth rotary drive is transmitted from the intermediate shaft to the wobble sleeve; the mode change element is formed integrally with an axial stop surface and the axial stop surface is engageable with a cooperating end stop surface formed integrally with one of the intermediate shaft and the wobble sleeve to limit the movement of the mode change element along the intermediate shaft.
2. A hammer according to claim 1 wherein the axial stop surface engages with the cooperating end stop surface when the mode change element engages both sets of teeth.
3. A hammer according to claim 2 wherein the mode change element is moved in a first direction along the intermediate shaft to engage both the drive teeth and the driven teeth, and the cooperation of the axial stop surface and cooperating end stop surface limits the movement of the mode change element further along the intermediate shaft in the first direction.
4. A hammer according to claim 1 wherein the cooperating end stop surface is formed by one or more end faces of one of the set of drive teeth and the set of driven teeth.
5. A hammer according to claim 1 wherein the axial stop surface is formed by an end surface of one or more recesses, which recesses extend axially with respect to the

longitudinal axis of the intermediate shaft and are formed in a face of the mode change element facing towards the intermediate shaft.

6. A hammer according to claim 1 wherein the mode change element is non-rotatably and axially slideable mounted on one of the set of the drive teeth and the set of the driven teeth.

7. A hammer according to claim 1 and further including a spring member which biases the mode change element into engagement with both the set of drive teeth and the set of driven teeth.

8. A hammer according to claim 7 wherein the spring member extends between a flange formed on the mode change element and a bearing ring for rotatably supporting the intermediate shaft in the housing.

9. A hammer according to claim 8 wherein the bearing ring forms an outer race for a set of balls which run between the outer race and an inner race formed in an external surface of the wobble sleeve.

10. A hammer according to claim 1 and further including a housing and a hollow cylindrical spindle mounted within the housing.

11. A hammer according to claim 1 wherein the mode change element is formed as at least a portion of a ring and is mounted co-axially with the intermediate shaft.

12. A hammer according to claim 1 wherein the mode change element is non-rotatably and axially slideably mounted on the intermediate shaft drive teeth.

13. A hammer according to claim 12 wherein the axial stop surface of the mode change element engages with a cooperating end stop formed on the wobble sleeve.

14. A hammer according to claim 1 wherein the mode change element is non-rotatably and axially slideably mounted on the wobble sleeve driven teeth.

15. A hammer according to claim 14 wherein the axial stop surface of the mode change element engages with a cooperating end stop surface formed on the intermediate shaft.
16. A hammer according to claim 14 and further including a spring member which biases the mode change element towards engagement with the intermediate shaft drive teeth.
17. A hammer according to claim 16 wherein the mode change element is formed with an engagement surface which is engageable with a cooperating engagement surface of a mode change actuator so as to prevent rotation of the mode change element and the mode change actuator engages the mode change element to draw it out of engagement with the intermediate shaft drive teeth and against the biasing force of the spring member.
18. A hammer according to claim 1 wherein the mode change element includes at least one axially extending recess formed in a radially inwardly directed surface of the mode change element, and an axial stop surface formed in the axially extending recess, and wherein the axially extending recess is engageable with both the set of drive teeth and the set of driven teeth.
19. A hammer according to claim 1 and further including a tool holder assembly, for holding a tool or bit so as to enable limited reciprocation of the tool or bit within the tool holder.